A METAL WINDOW DICTIONARY

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Containing illustrated descriptions of technical terms used in manufacture and installation

By
W. F. CRITTALL

MANOR WORKS BRAINTREE
1953

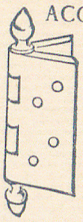
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INTRODUCTION

IN 1926 a small dictionary for the instruction of trainees in the nomenclature of terms used in metal window making was published. Since that time many developments in the design of Metal Windows have taken place, and many improvements in production methods have come into use, such as rustproofing by means of Hot Dip Galvanizing and various methods of electric welding. Thus while some technical terms have become obsolete others have come into common use in the industry since the date of the earlier publication.

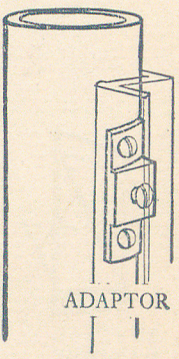
This new dictionary does not pretend to cover the whole field in Metal Window manufacture but it may be of some help to trainees, architectural students, and builders who are interested in the subject.

A



ACORNS Finials on hinges on bronze windows.

ADAPTORS Small metal plates screwed to tubular mullions, with a projection set at an angle of 30°, to enable Standard Metal Windows to be fixed at any angle.



ALLOWANCE Difference between the overall size of a metal frame and the opening into which it is to be fixed. For ordinary stone or woodwork ⅛″ in height or width.

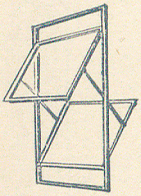
ALUMINIUM Produced from Bauxite and weighing about one-third of steel. Its use has been developed by the aeroplane. In the form of extruded bars, and sometimes cast into frames, it is now largely used in the metal-window industry, replacing bronze in many cases as a decorative material. It has poor torsional properties. When the cost of a section of comparable strength reaches that of steel per foot run it will be a serious competitor in the metal-window industry.

ANODIZING A hard smooth coating of aluminium oxide formed on aluminium by placing the object in a lead bath containing sulphuric acid through which an electric current is passed. *See Appendix III.*

ARC WELDING *See Welding.*

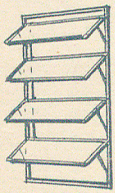
ARENS CONTROLS For operating ventilators out of reach, consisting of a reinforced wire enclosed in a tube which can be bent to conform to angles of the opening, and of sufficient stiffness to permit it to *push* as well as pull.

ASTRAGAL Small mouldings round the tops and bottoms of columns. This term is sometimes used to indicate glazing bars (generally in the U.S.A.).



AUSTRAL WINDOW

AUSTRAL A type of window in which the upper and lower halves are joined together by a connecting arm in such a manner that when the upper half opens outwards and slides down the lower half opens inwards and slides up. (Of Australian origin.)



AWNING WINDOW

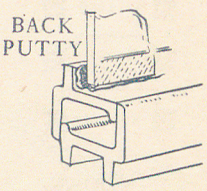
AWNING WINDOW A series of top-hung projected ventilators each about 12″ deep, coupled together. Also known as a Miami window (U.S.A.).

B

BACK PLATE Instead of being bolted direct to the steel handle bracket, as is the case with standard metal windows, the handles on Universal Casements may be mounted on a

separate plate which is, in turn, screwed on the handle plate. This allows the handle to be detachable so that it can be fixed after the window is otherwise completely erected.

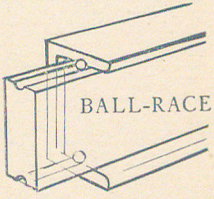
BACK PUTTY All glass must have a proper bedding of putty between it and the glazing rebate. The omission of this is a frequent cause of leakage and glass breakage.



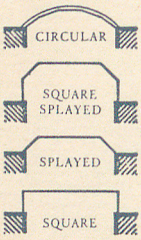
BALES CATCH (not ball catch) A self-acting latch for hinged frames, consisting of a ball-nosed spring-loaded plunger in a socket sunk into the frame and engaging with a countersunk hole.

BALL CENTRES In vertically pivoted windows a hardened steel or phosphor-bronze ball was mounted in the lower pivot on which the opening leaf took its bearing. This method is now obsolete.

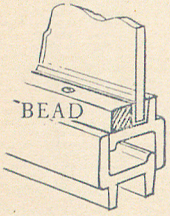
BALL-RACE In sliding doors various kinds of running gear are used at the top usually consisting of wheels with ball-bearings running in metal channels (Coburn or Henderson). Another variation consists of a fixed channel containing a runner bar sliding on balls in machined grooves.



BASCULE A counterbalanced frame or panel.



BAY WINDOWS



BASEMENT SASH A bottom-hung sash in which the ventilator is of the 'lift out' type for the admission of coal into the basement. A standard requirement in most American houses.

BAY WINDOW A window consisting of two or more units fixed at varying angles to each other.

BEADS Sometimes called glazing fillets. Strips of wood or metal attached to the frame with brass screws or studs. Used instead of front putty usually for inside glazing.

BEDDING *See also Paneing Down.* When a casement is fixed into a surrounding metal frame it is 'bedded' in mastic to ensure weathertightness.

BIRMABRIGHT An aluminium alloy.

BOLT A sliding bar or rod for door fastening. Also square or hexagon-headed screw used with a nut for assembly of frames, etc.

BONDERIZING A method of cleaning and etching steel bar by immersion in a solution of phosphoric acid and zinc phosphate for about five minutes.

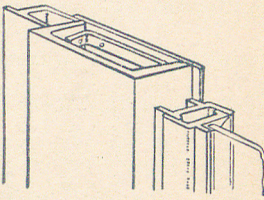
BORROWED LIGHTS Windows fixed inside a building which obtain their light from the external windows in wall or roof.

BOSS A round metal knob or stud. Also the

circular portion of a hinge in which the hinge pin is fixed. *See Leaves.*

BOWDEN CONTROL Similar to Arens Control but lacking the rigidity required for *pushing.*

BOW WINDOW A bay window. Elliptical or semi-circular on plan.



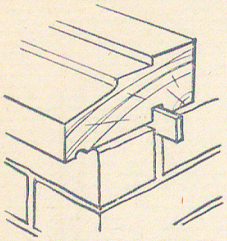
BOX MULLION

BOX MULLION A mullion built up of steel channels of various sizes, closed in at the back by a flat strip of metal.

BRASS An alloy of copper and zinc. For casting and extrusion 60/40 brass is used. For cartridge cases etc. 70/30 is used and for gilding metal 90/10.

BRAZING Before welding was introduced the corners and brackets of steel frames were brazed. After the corners had been dovetailed and riveted together the interstices of the joint were filled with molten brass. A small pellet of brass was placed on the joint and melted by means of a blow-pipe. To serve as a flux borax was used. The borax had an inconvenient habit of coming to the surface after the casement was fixed, breaking through the paint and allowing rust to start. This process is now superseded by welding.

BRITISH WIRE GAUGE (Abbreviation B.W.G.). Denoting the thickness of a steel plate or wire.



BROKEN JOINT

BROKEN JOINT When two flat surfaces are placed face to face the joint between them is said to be an open or flush joint, and in building construction would not be considered satisfactory from the point of weathertightness unless some means were taken of covering or 'breaking the joint'. This may be done by forming grooves in the two flat surfaces and inserting a bar to fit into the groove, or with cement or mastic.

BRONZE An alloy of copper and tin in various proportions. This material does not lend itself to extrusion and therefore when bronze casements are called for, the sections are extruded from brass to which a small percentage of manganese has been added for toughening. The casements are usually toned chemically to the required colour.

BULLSEYE A circular window.

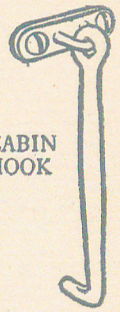
BUTT JOINT Two metal bars placed or joined together end to end. (Sheep butt one another head to head.)

BUTTS Ordinary door or window hinges in which the length of the knuckle is greater than the width across the leaves when open.

C

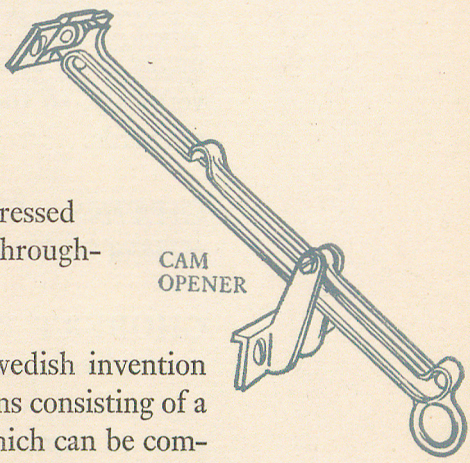
CABIN HOOK A device for holding doors open consisting of an eye attached to the opening

part and a hook fixed to the wall. Preferably at handle height to avoid stooping to operate.


CABIN HOOK

CAMES The bars in lead glazing are called cames. They are made in various widths from $\frac{1}{4}$" to 1". They are also of various sections, flat, half-round and beaded. The most usual type is $\frac{1}{2}$" wide beaded. *See also Saddle Bars.*

CAM OPENER A fitting for opening top-hung casements which are out of reach.


CAM OPENER

CAMPBELL WINDOW A double-hung sash made of pressed steel sections used extensively throughout the U.S.A.

CARDA WINDOW A Swedish invention of which there are several versions consisting of a large H.C.H. double window which can be completely reversed over 360° and easily separated for glass cleaning. An additional feature embodies a Venetian blind between the inner and outer windows.

CASEMENT A hinged metal or wood frame to contain glass forming part of a window.

CAST-IRON FRAMING Metal windows are sometimes fixed into cast-iron surrounds, which material lends itself readily to architectural treatment and is less costly than stone.

CAVETTO A concave moulding.

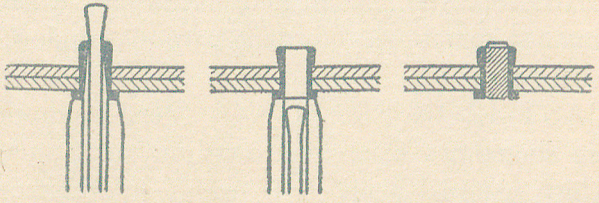
CAVITY WALLS A construction consisting of an inner and outer wall with an air space between.

CELOCIA A Spanish name for an external shutter.

CENTRE-HUNG CASEMENTS Casements hung upon centres, either horizontally or vertically, so that part opens inwards and part outwards.

CHAINS *See also Cords.* Sometimes used in place of cords.

CHOBERT RIVETS Rivets used on work in which one surface only is accessible for riveting. Hollow rivets are threaded on to a steel wire with an expanded end, the wire and rivet is placed in the hole and the wire is forcibly extracted, the expanded end heading the rivet on the inner end. The hole in the tubular rivet is usually closed by driving in a tapered steel peg.



1 2 3

CLAMP A form of sliding stay consisting of a brass clamp mounted on a swinging arm and actuated by a 2-start screw and sliding over and engaging with a brass rod attached to the opening frame.

CLEANERS' HOOKS In those types of windows where cleaning from inside is not otherwise provided for (such as sliding sashes, etc.), bronze eyelets may be fixed to the outer frame at the jambs to receive the hooks of cleaners' safety belts.

CLEANING CASEMENTS Casements in which the outside of the glass can be cleaned from the inside of the building.

CLEANING OFF Removing by filing or other means the surplus metal left after welding.

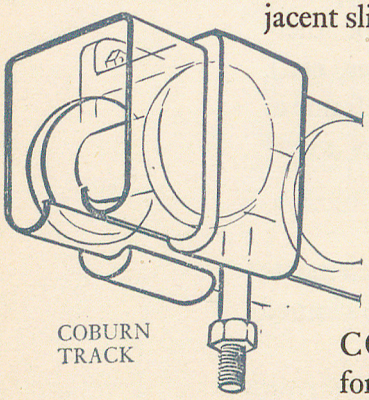
CLEARANCE The space allowed between the opening and fixed frames of casements.

CLEAT A piece of metal round which the cords which operate upper ventilators are made fast.

CLEVIS U-shaped iron at the end of a beam for attaching tackle. The name is used to designate a window handle when applied to a U-shaped bracket (U.S.A.).


CLEVIS

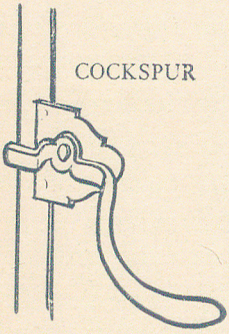
CLOCK WEIGHT *See Sash Weight.* In double-hung sashes where the height is insufficient to permit the use of ordinary counterbalance weights, the cords or chains, instead of being attached direct to the weights, are passed through pulleys thus halving the travel of the weight. The same device is also used when adjacent sliding sashes share a common weight box.



COBURN TRACK

COBURN OR HENDERSON TRACK A semi-closed inverted U-shaped channel fixed below a lintel or beam serving as a track for pairs of wheels from which frames are suspended.

COCKSPUR An old-fashioned term for a casement handle, probably so called on account of its shape.



COCKSPUR

COMPOSITE WINDOWS Two or more units consisting of any type of opening or fixed frame combined by means of coupling bars in one opening. A C2 E2 standard metal window is a composite window, but a C4 is not a composite window.

CONCEALED BOLTS Bolts fixed *inside* the meeting rails of doors and windows. There is an increasing tendency to fix all window accessories and fittings out of sight.

CONCERTINA WINDOWS *See Sliding Folding Windows.*

CONDENSATION GUTTERS A very large quantity of water is used in the construction of all buildings, and during the time that the building is drying immediately after completion this water will appear in the form of condensation upon walls and windows, particularly during cold weather. For many years various makers provided condensation gutters or lips on the bottom members of frames for the purpose of catching and disposing of the water. These gutters were usually of brass and provided with outlet holes. In actual practice, however, these devices have proved to be unsatisfactory because, in the first place, they were not large enough to contain the excessive amount of moisture which appeared in the initial stages of drying and, secondly, the outlet holes became easily clogged and choked, or worse still, if kept open they very often served as inlets for rain and wind in spite of the baffle plates which were often provided to prevent it. It is now generally recognized that once the initial condensation has disappeared there will no longer be any need for gutters which are a potential source of draught and leakage. In cases where the initial condensation may be expected to be excessive, or to continue over a long period, open channels are occasionally formed on the sill itself to collect condensation from which it will evaporate or can be easily mopped up.

CONNECTING BAR *See Mullion and Transome.*

CONNECTING ROD Metal bar joining together the upper and lower handle on casements where a single handle would not firmly shut the window on account of its height. *See Two-Throw Handles.*

CONTACT The shutting surfaces of casement and frame. Owing to rolling inaccuracies and variations in manufacturing processes, a hand process known as bedding, setting, paneing down or adjusting, is usually necessary to obtain good contact. In practice 100% contact is neither practical nor desirable and a space of up to 5/1000th inch is usually allowed to avoid paint binding at the jamb.

COPPER BEARING STEEL A steel alloy containing up to 0·5% of copper for which rust-resisting properties are claimed.

CORDS Used for operating spring catches on ventilators which are out of reach. Also for attaching weights to sashes in sliding windows.

CORROSION The attack of a metal by the elements, e.g. air, water, salt or by other chemicals, to form oxides etc. Aluminium and zinc form white corrosion products. Iron forms iron oxide or rust.

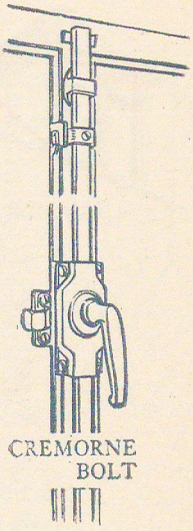
COSLETTIZING *See Rustproofing process.*

COTTAGE WINDOW A standard metal window or S.M.W.

COUNTERSUNK HOLES Screw or rivet holes are countersunk to allow the head of the screw or rivet to be flush with the section.

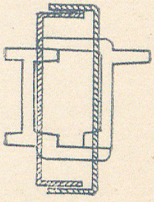
COUPLING BAR *See Mullion and Transome.*

CREMORNE BOLTS A fitting extending the full height of the meeting rail of folding windows and doors to fasten them at top and bottom. A central handle operates two sliding bolts, one upwards and one downwards.



CREMORNE BOLT

CUP PIVOTS For vertical or horizontal hung ventilators, consisting of two brass cups, one working inside the other, riveted one to the inner and one to the outer section.



CUP PIVOTS

CURTAIN ROD BRACKETS Standard metal windows are drilled and tapped to receive screws for attaching curtain rod brackets.

D

DAYLIGHT SIZE The 'sight' size of any frame or opening.

DIPPING Metal windows are immersed in molten spelter or paint as a means of applying the protective coating.



DORMER

DORMER WINDOWS The origin of the word implies dormitory or sleeping room windows which, in medieval times, were usually in the roof. As the window could not in those days (nor conveniently in these) be made sloping, a projection was built out in which the window was fixed.

DOUBLE GLAZING Frames provided with two sheets of glass with an air space between. Used in cold countries to avoid draughts set up by radiation or leakage. *See Double Windows.*

DOUBLE HUNG WINDOWS Sliding sashes hung on cords or chains, or mounted on spring balances, at either side to slide up and down.

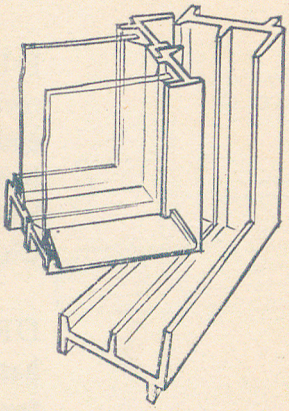
DOUBLE PANELS The kicking plates of doors are usually double and either spot or projection welded to the frame. This construction provides a rigid cross member to the frame and eliminates the whippiness.

DOUBLE WEATHERING Casements which have inner and outer shutting surfaces or contacts.

DOUBLE WINDOWS For the conservation of heat and to minimize street noise, double windows or glazing are installed. This may take several different forms.

(1) Two entirely separate windows. To be satisfactory there must be no contact between them; the inner and outer window and the reveals should be covered with some non-conducting and sound-absorbing material.

(2) Two sheets of glass separated from each other in the same frame. It is essential that no moisture is enclosed and that the glazing is airtight otherwise fogging will ensue. To avoid this the two sheets are sealed together by a distance strip under factory conditions (Thermopane). The overall thickness of the sheets may require specially wide frames.

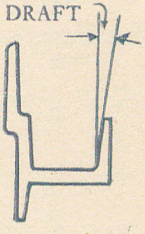


DOUBLE WINDOW SECTION No. 3

(3) Two glazed frames hinged together and hung in a common outer frame, easily separated for cleaning.

DOVETAIL JOINT Wedge-shaped tenon fitting into a corresponding shaped mortice. This form of joint was the accepted method of forming the corners of casement frames until the introduction of welding.

DOWEL A plug or headless pin of wood or metal used for making joints.



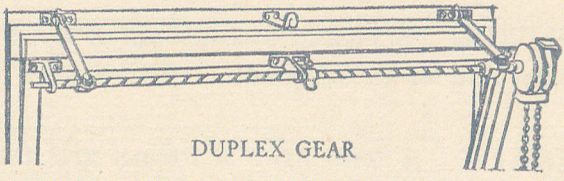
DRAFT A term used in rolling steel bars. Channels with parallel flanges would have a tendency to stick to the rolls so the sides have to be slightly tapered.

DRIP BARS *See Weather Bars.*

DRIVING SCREWS Hardened steel metal screws with coarse threads and tapered ends capable of cutting their own threads and being driven, with a screwdriver, into untapped holes. Driving screws for wood can be driven with a hammer.

DROPPING Casements may drop on the handle side unless the weight of glass is disposed towards the hinge side, by packing or wedges. This is particularly noticeable in very wide casements.

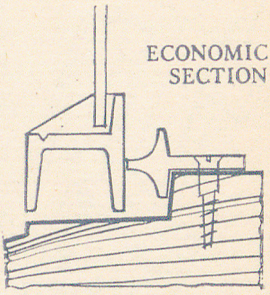
DUPLEX GEAR A device for opening ventilators which are out of reach, consisting of a horizontal screwed rod, on which are mounted two nuts. Attached to each of these nuts is a rod, the other end of which is fixed to the opening frame. As the screwed rod revolves the nuts travel along it in opposite directions and push the rods outwards or inwards to open or close the window. Also called twin screw opener.



DUPLEX GEAR

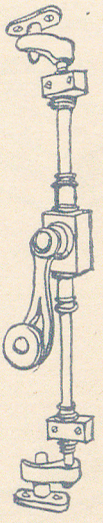
DURALUMIN A proprietary brand name covering several aluminium alloys.

E



ECONOMIC The forerunner of the Standard Metal Window. A window for fixing to wood frames, consisting of a metal frame hinged to the woodwork shutting against metal strips screwed to the wood rebate. (Sometimes called knife edged windows.)

ESCAPE VENTILATOR A side hung casement supplied in certain types of standard sash as an emergency exit. Fire Office regulations call for one vent in each window to open right down to the sill and to be sufficiently large to enable a grown-up person to pass through.


ESPAGNIOLETTE BOLT

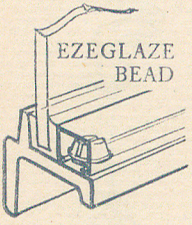
ESCUTCHEON A small metal disc to cover the keyhole of a lock to prevent draught.

ESPAGNIOLETTE A variation of the Cremorne bolt as a fitting for folding windows and doors in which the vertical rod is provided with a hook at top and bottom and is capable of being revolved one quarter circle by a pivoted handle centrally fixed. When the rod is revolved two hooks engage or disengage with a slot prepared in a fixed frame.

ETCHING The final process in HOT GALVANIZING. Immediately after coming from the spelter bath the frames are immersed in diluted

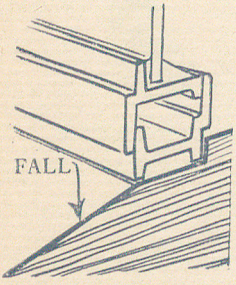
phosphoric acid to counteract the 'greasy' surface of the zinc and provide a surface ready to receive paint. Galvanized surface will etch itself naturally if exposed to the atmosphere for about six weeks.

EXTRUDED SECTIONS Sections formed by pushing a heated billet through a die by hydraulic pressure. Many profiles which cannot be rolled can be extruded, e.g. tubular sections. Materials commonly used for extruded sections are copper/zinc and aluminium alloys.



EZEGLAZE BEADS Glazing beads made of light gauge cold rolled steel of channel shape with inturned edges which are attached by snapping them over shouldered studs or screws. Usually they are cut off square ended, the corner being finished by pressed metal cover.

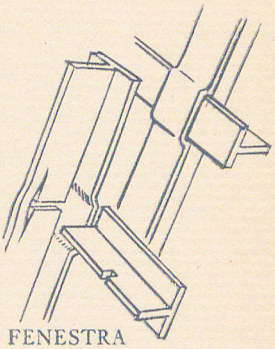
F



FALL The slope of the sill to allow rainwater to get away from the window.

FANLIGHT Originally a semi-circular piece of glazing over a door, the radiating bars resembling a fan. Nowadays, an 'upper' window out of reach.

FENESTRA (*Latin—window*) The trade name given to an invention of intersecting glazing bars by means of threading them through each other instead of mitring them, which had hitherto been the accepted method. There are many variations of this system.



FENESTRA JOINT

FENESTRATION The arrangement of windows in a building.

FILLET A thin strip of wood or metal attached to a frame for various purposes such as increasing the width, or fixing to grooved openings. Beads are sometimes called glazing fillets.

FITTINGS Usually called hardware. Attachments to windows for the purpose of operating them, such as handles, stays, etc. In some cases fittings may be sent separately packed from the windows to prevent theft or damage during transit or erection.

FIXED LIGHT A window which is not made to open. Sometimes called a fast light.

FIXING The fixing of metal windows is a skilled job. It is impossible to make a metal window which cannot be spoiled by bad fixing. Makers prefer to undertake the fixing of purpose made windows themselves, but standard windows are usually installed by the contractor and fixing instructions are sent with every consignment. Fixing *includes* the sorting of windows,

carrying them to the openings, marking off lug or plug positions; assembling composites, bedding and pointing them with mastic inside and out at the mullions and transomes; fixing lugs to the frames, placing the windows in the openings and bedding them with mastic at the sill, plumbing up, wedging into position and adjusting the ventilators ready for the contractors to cement in the fixings and form the cement fillet (where necessary); raking out the joint on the outside between the frame and the builder's work at the head and jambs and pointing with mastic cement; later (when rougher trades have finished) applying fittings, fixing any gearing or hopper side-cheeks, and giving the ventilators final adjustment. Fixing *does not include* unloading at site, hoisting or carrying to the appropriate floors, cutting away, making good, drilling and/or tapping steelwork, supplying or fixing lead flashing to curbs or builder's work, cutting holes for lugs or plugs, cementing in lugs or plugs, forming cement fillet, glazing or painting after fixing. Any necessary scaffolding, ladders and trestles to be provided and erected free of cost to the maker.

GENERAL NOTES

Unloading. Windows are never sent in larger bundles than 8 cwt. Where there are no facilities for handling such a bundle the splines should be removed in the truck and the windows transferred to a lorry or cart, one at a time.

Handling. Windows must be carried, not dragged along the ground, as this damages the zinc or paint coating.

Storage. All windows must be stacked on edge; never lay them horizontally. Care should be taken with composite windows to see that the coupling screws are not strained.

It will pay to stack windows on wooden splines.

Store under cover and in a dry place.

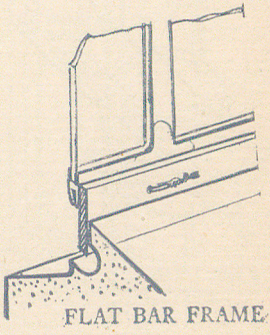
See that in stacking windows the fittings of one window are clear of the window next to it.

Erection. Except in cases where windows are built in, they should be left until all the rougher trades have left the site and the openings are ready for glazing. The frames are not designed to carry any weight at the head. Care must be taken to see that the windows are not damaged by placing scaffold boards on the sills, or glazing bars, or by drawing heavy objects through the openings.

FIXING HOLES Holes drilled for screws to attach the window to the surrounding frame or masonry.

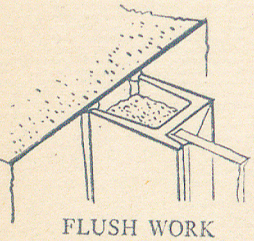
FLASHING In glazed roofs and skylights the joint between the glass and the wall is generally covered by a sheet of lead, one edge of which is tucked into a joint in the brickwork, the other edge being pressed down on the glass.

FLAT BAR FRAMES Antique windows were made of a flat section of iron to which the lead glazing was attached by rivets. This construction is not used today except in imitation of the antique.



FLAT BAR FRAME

FLOOR SPRINGS For swinging doors, consisting of various arrangements of springs, concealed in a box flush with the floor, attached to a shoe which is fixed to the door leaf to allow it to open in either direction and to come to rest in the closed position.



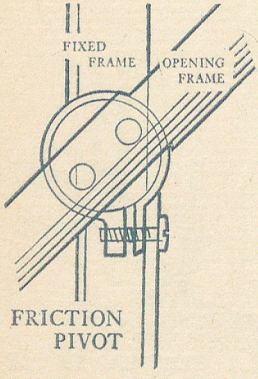
FLUSH WORK

FLUSH WORK Masonry openings which are formed without any break or check for placing the frames against.

FLYSCREENS Made of 16 mesh aluminium gauze attached to a grooved aluminium or galvanized frame by split tube or plastic splines, and attached to the inside of S.M.W.s, except on bottom-hung larder windows, when they are on the outside.

FOLDING CASEMENTS Two side-hung casements (opening either inwards or outwards) combined in one outer frame without a fixed meeting rail.

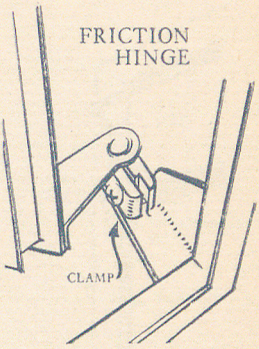
FRAME In talking of casements they are often described as 'casement and frame', the casement being the inner or opening frame and the other being the outer or fixed frame.



FRENCH WINDOWS Folding casements, without fixed meeting rails, which come down to the floor level and are used as doors.

FRICTION PIVOTS OR CENTRES OR HINGES The free working of pivots, etc.,

is sometimes purposely checked by the use of springs or braking bands, the object being to allow the ventilator to remain in a given position without the use of a stay and stiff enough to withstand a certain amount of wind pressure.



FROG The indentation of the lower face of a brick is called a frog. The channel-shaped groove on the anterior side of the fixed frame of a metal window serves the same purpose of providing a check to be filled with cement to break the joint.

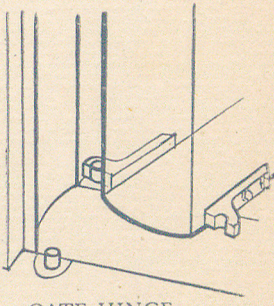
FURNITURE Fittings for doors.

G

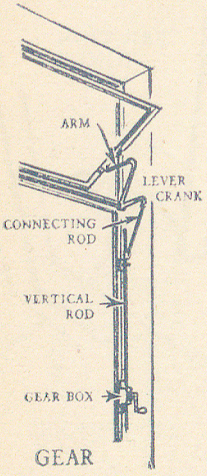
GALVANIZING (HOT) *See Rustproofing.*

GALVANNEAL Sheet metal which is annealed after hot dip galvanizing to enable the sheet to be bent without cracking the zinc coating.

GATE HINGES For swinging doors in which the door is suspended from a ball bearing thrust washer fixed in the head and free to ride in both directions on two separate bearings at the bottom, eventually coming to rest in the closed position. A development of the gate in common agricultural use.

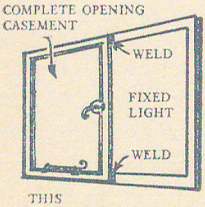


GATE HINGE



GEAR

GLAZE AT SIDE



THIS CASEMENT GLAZED AT SIDE

GEARING For operating ventilators which are out of reach mechanical means of opening and closing are sometimes used instead of cords.

GLAZE AT SIDE A construction used in purpose made windows in which a fixed light and a ventilator are combined in one unit, one side of the ventilator becoming the fourth side of the fixed light which may be on one or both sides of the ventilator, or at top and bottom, but usually not both.

GLAZING Fixing glass into metal windows. All standard metal windows are glazed from outside. Standard sashes are glazed inside. The majority of purpose made windows glaze from inside, for which it is usual to use metal or wood beads. Glass must never be put against the metal rebate, a thin layer of putty must be spread over the rebate first and the glass pressed firmly against it. Glazing spriggs are not necessary for small panes. Where no glazing bars are used the weight of the glass should be thrown on to the lower hinge corner by small wooden wedges placed between the edge of the glass and the metal frame.

GLAZING BARS When windows are divided into panes or 'squares' the dividing bars are called Glazing Bars, not to be confused with the cames of lead glazing.
Glazing bars are used:

(*a*) to conform to some architectural effect. It is sometimes argued that openings without some such form of subdivision give an empty effect;

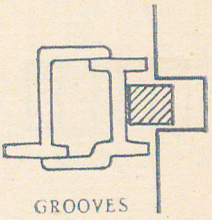
(*b*) to economize in glass. It is supposed that where there is risk of breakage, such as in tenements, schools, factories, etc., that the question of replacement makes the subdivision by panes desirable. It has been found, however, at any rate so far as tenements are concerned, that this factor is negligible and there is an increasing tendency to omit them in buildings of this sort.

(*c*) to make windows burglar-proof. In some cases grilles are omitted, the glazing bars serving the same purpose. In the case of ventilators some form of locking device is included;

(*d*) to stiffen the opening frame.

GRILLE A grille is a bar or set of bars fixed in an opening for purposes other than to receive glass. Usually protective.

GROOVES Before opening casements were invented stone window openings were generally formed with a square groove (about $\frac{1}{2}''$ wide and deep) to receive the lead glazing. The lead glazing, owing to its flexible nature, could be fitted into this four-sided groove. This method survives today in ecclesiastical buildings and casements are fixed to it by flat bars attached by screws.



GROOVES

GROUT A mixture of cement and water which can be poured into the joint between the metal frame and masonry when fixing.

GUARD BARS Bars fixed behind opening lights to prevent entrance or exit.

GUILLOTINE Sliding sashes. Windows sliding up and down in grooves.

GUNMETAL An alloy of copper and tin. Admiralty specification, Copper 88%, Tin 10%, Lead 2%.

GUNMETAL WORKING PARTS The pivots or pins upon which the moving parts of fittings or hinges work are usually made of brass.

GUT BARS Glazing bars—a workshop expression.

H

HAND A casement is right hand if the hinges are on that side looking from inside.



HANDED

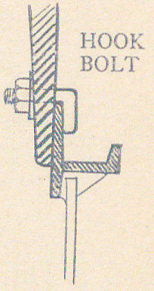
HANDED An equal apportionment of right and left hand parts, or frames.

HANDLE PLATE A piece of metal attached to the opening frame of the casement on to which the handle is attached. In the case of the Universal Casement the handle may be mounted on a back plate although this is now becoming obsolete. With the Standard Metal Window the handle is attached direct to the handle plate.

HARDWARE Fittings.

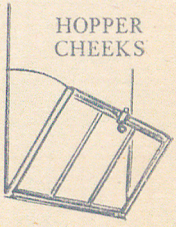
HEAD The top of the opening.

HELICAL SPRING HINGE (SINGLE ACTION) Hinge embodying a spring within the knuckle in order to make a door self-closing. (DOUBLE ACTION) A hinge embodying two knuckles each enclosing a helical spring so that the door may swing in both directions and will come to rest in the closed position.



HOOK BOLT A bolt bent at various angles for fixing metal frames to structural steel.

HOPPER CHEEKS Windows hinged at the bottom are sometimes provided with side pieces to prevent draught. These side pieces are called hopper cheeks and are alternatively made of sheet metal or angle frames to receive glass (when daylight obstruction is a consideration).



HORIZONTAL CENTRE HUNG (Abbreviation H.C.H.). Casements swinging on pivots in the sides. The pivots are usually placed centrally in the height so that the bottom or outward opening portion balances the upper or inward opening portion. The ventilators in Standard Sashes are H.C.H. except the special escape ventilators which are side hung.

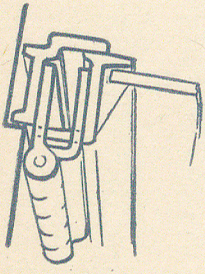
HORIZONTAL SLIDING SASHES Windows in which the leaves move sideways, either in front of each other or into cavities at the jambs.

HOT TENON RIVETING Formerly the tenoned ends of glazing bars were secured by a hand hammer. Power hammers and various kinds of presses have been introduced. The present method is to heat and upset the tenon electrically. This method has now been applied to fittings and hinge attachment.

I

IMPACT EXTRUSION A cold aluminium slug is placed in a die of the required shape and driven through it under pressure, emerging in tubular form with very thin walls ($\frac{1}{32}$″).

INSIDE GLAZING Windows may be made to have their glass put in either from the inside or the outside. Windows in high buildings are usually glazed from inside to facilitate repairs. Standard Metal Windows are only made for outside glazing.



INSIDE HINGE

INSIDE HINGES Hinges in which both leaves are contained between the fixed and opening frames. Used in cases where ordinary hinges would foul the masonry and undesirable in that frames are weakened by the amount of metal cut away to make room for them.

INTERSECTION Cross joint of glazing bars.

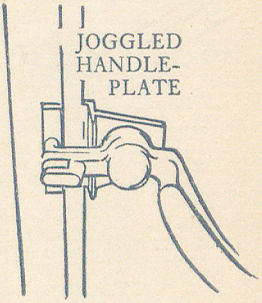
J

JALOUSIES (FRENCH) Shutters.

JAMB The sides of the opening into which the window is fixed, whether brick, stone, steel or wood.

JOGGLE A depression in a steel bar, usually to accommodate another bar, as in the Fenestra joint.

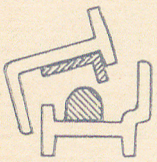
JOGGLED HANDLE PLATES When casements glaze from outside, as in Standard Metal Windows, there is insufficient space between the glass and the handle plate to enable the back of the plate to be painted after glazing. To overcome this the handle plate is sometimes joggled or off set. This type of plate also permits the handle to be attached or replaced after the window is glazed.



JUSS (ARABIC) Mortar, very quick setting and brittle, containing a large percentage of gypsum. Somewhat similar to plaster of Paris.

K

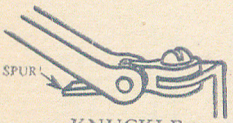
KALON SCREWS *See Driving Screws.*



KEEP

KEEP A tongue-like projection in the middle of the hinged member of an opening door frame engaging with a slot in the fixed frame to ensure tight closing in the absence of a central hinge.

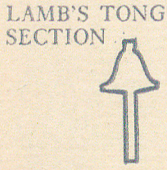
KICKING PLATE Most glazed steel doors are supplied with a solid panel at the bottom (usually double), otherwise, if the glass came right down to the floor, it would stand a chance of being broken by people's feet. This plate acts as a stiffening member to the door.



KNUCKLE

KNUCKLE The universal joint connecting the stay to the window to allow the stay to be moved in any direction. Stay knuckles are provided with a spur or stop to prevent the stay dropping below the horizontal position. The boss of a hinge is also called the knuckle.

L



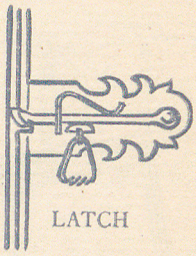
LAMB'S TONGUE SECTION

LAMB'S TONGUE SECTION Now obsolete, though occasionally used. The earliest steel windows were imitations of wood in which material lamb's tongue mouldings are still used.

LANTERN LIGHTS Skylights with vertical glazed sides.

LATCH A spring handle. An old-fashioned type of casement handle which automatically

remains shut when slammed; a feature not embodied in the ordinary casement handle. It consists of a pivoted arm loosely riveted to a plate with a spring above it. The arm engages with a projection on the fixed frame when closed. The arm has a bevelled nose which rides over the projection, the spring pressing it down behind the projection when slammed.


LATCH

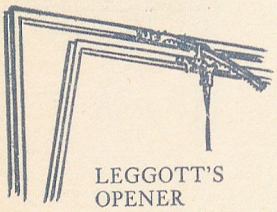
LATTICE Diamond pane lead glazing.

LEAD COVERED BARS The steel glazing bars in skylights or north lights are usually sheathed with a lead covering to prevent corrosion. The sheath is provided with lead fins which are pressed down on to the glass in place of putty.

LEAD GLAZING OR LEADED GLASS The earliest form of filling an opening with glass. When glass was first introduced it was only procurable in small pieces which had to be joined together by lead strips (cames) in order to make the glass large enough to cover the opening. About a century ago larger sheets of glass were obtainable, though costly, so that leaded windows are associated with all old buildings and are a characteristic feature of English architecture. Its use is still common where a picturesque effect is desired.

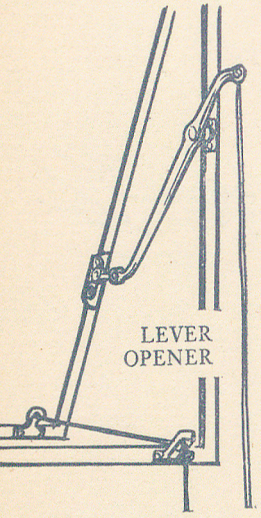
LEAVES The leaf of a hinge is the flat part through which the screws or rivets are fixed.

Also called flap. The leaves of a folding casement are the two opening frames.



LEGGOTT'S OPENER

LEGGOTT'S OPENER A device for opening windows which are out of reach, consisting of a quadrant-shaped rack attached to the opening frame, engaging with a worm wheel on the fixed frame, operated by a cord. Sometimes called a rack opener.



LEVER OPENER

LEVER OPENER A device consisting of a pivoted lever mounted on the side of the fixed frame for opening windows which are out of reach. One end is coupled to the opening frame, and to the other end a cord is attached. By pulling the cord the window is opened. It is not suitable for windows over 2′ 0″ wide.

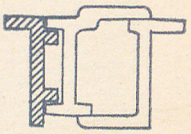
LEWIS PLUGS OR DOGS An alternative to wood plugs for fixing windows to masonry, consisting of a wedge-shaped piece of cast-iron with ragged corners with a tapped hole in the end for the fixing screw. A hole is cut in the masonry for the plug, which is cemented in.

LIFT (SASH) Outstanding bracket fixed to bottom leaves of sliding sashes to raise or lower them.

LIGHT A fixed or opening window, often a division of a large window.

LINTEL The head or top of an opening, consisting of a wood, steel or concrete beam.

LLOYDS COUPLING BAR Where fixed frames occur, both below (or above) and at the side of ventilator, a coupling bar giving a minimum sight line is sometimes preferred to the usual T bar and separate frame. This is known as a Lloyds coupling.



LLOYDS COUPLING

LOCK Appliance for securing a door or window by means of a bolt requiring a specially shaped key to operate it.

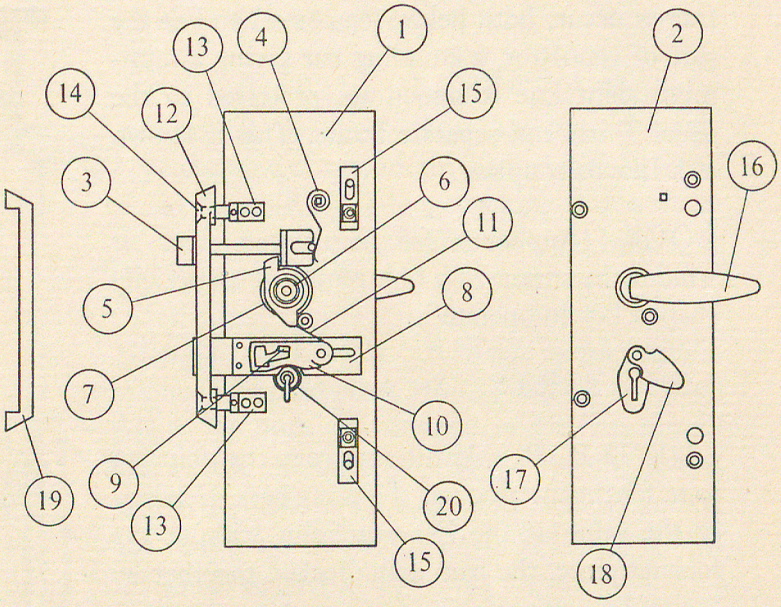
LOCK PARTS *See page* 34.

LOK'D BAR An alternative to the Fenestra joint for the intersection of glazing bars. Generally the same as the Fenestra joint without the locking piece, the bars being locked together by hydraulic pressure.

LONG ARM Spring catches on bottom-hung or H.C.H. casements which are out of reach are sometimes operated with a pole with a hook on the end to engage with the eye of the spring catch. These poles are called Long Arms. They are an alternative to cords.

LOOSE PIN HINGES Hinge pins are occasionally made removable to enable the casement to be removed from its frame, either for manufacturing purposes or subsequently for other reasons.

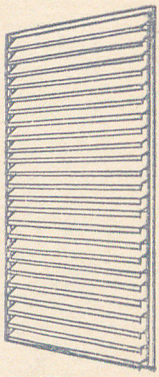
LOUVRE A series of H.C.H. or sometimes top- or bottom-hung casements combined and



NOMENCLATURE OF LOCK PARTS

1 Plate
2 Cap
3 Spring Bolt
4 Bolt Spring
5 Follower
6 Follower Spring
7 Follower Bush
8 Dead Bolt
9 Bolt Stump
10 Levers
11 Lever Spring
12 Forend
13 Forend Lugs
14 Forend Screws
15 Floating Nut Assembly
16 Handle
17 Escutcheon
18 Escutcheon Cover
19 Striking Plate
20 Sash Ward

coupled together to operate simultaneously. Often used in breweries. Fixed louvres as used in shutters are called slats when made of wood. Old village carpenters call them luffer boards.



LOUVRE

LUG A projecting piece of metal attached to the fixed frame of windows by screws, rivets or by welding, for fixing to masonry.

M

MALLEABLE IRON Cast iron window fittings, principally gearing parts, are generally too hard for machining and too brittle to be reliable. They are therefore cast in a special grade of iron (white heart) and annealed by being packed in a container mixed with hematite iron ore and heated to 900–1000° centigrade for several days and allowed to cool off slowly.

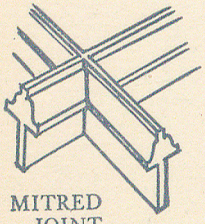
MARGINAL PANES As an alternative to the ordinary rectangular pane, glazing bars are sometimes applied all round the frame a short distance from the edge. They are supposed to counteract the thin appearance of the metal frame and make it look more substantial.

MASTIC A material consisting of asbestos chalk and a non-drying oil used for making a waterproof joint between the casement and the surrounding masonry. It has the merit over putty

in not staining the stonework as putty does and remaining elastic without cracking. *See Pointing.*

MEETING RAIL In folding windows or doors the centre bar, where the two opening casements join when shut, is called a meeting rail. Sometimes (especially on high buildings) a fixed bar is provided for both leaves to fasten to. This bar is called a fixed meeting rail or mullion bar. *See Folding Casements.*

MIAMI WINDOW Awning window.

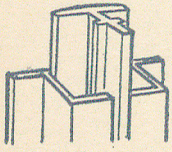


MITRED JOINT

MITRED JOINT The intersection of two glazing bars by cutting half of each bar away. In order to prevent the joint coming apart due to fire or other undue stress the joint is generally welded on the under side.

MOULDED SECTIONS Steel or brass bars in which the glazing rebates are enriched as opposed to the tee bar which is flat.

MOULDING Rolled steel and extruded sections applied to panels and frames either for ornament or to cover a joint.



MULLION A vertical division of a window originally in wood, brick or stone. With the development of the metal window the member formed by the joining together of two casements or fixed lights is called a mullion.

MUNTIN A glazing bar.

N

NON-PROJECTING STAY A stay which does not project into the room.

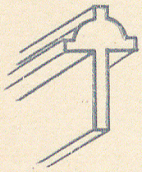
NORTH LIGHTS Modern factory buildings are sometimes designed with saw-tooth roofs, the most vertical side facing north and glazed. This glazing is occasionally made to open outwards either whole or in part, for which purpose various kinds of mechanism are made, operated either electrically or by hand.

O

OPENING The aperture in any building into which a door or window is fixed, consisting of jambs (the sides), head or lintel (the top) and sill (the bottom). The opening may be subdivided horizontally by a transome or vertically by a mullion.

ORIEL A bay window projecting usually from an upper storey and supported either from the ground or on corbels or brackets.

ORNAMENTAL HANDLE PLATES The blacksmiths who made the old flat bar frames occasionally expended their fancy and skill in elaborating the brackets to which the fasteners



OVOLO

were attached. Later these were reproduced in malleable iron and are now practically obsolete.

OVOLO Another form of moulded glazing bar, now obsolete. Only used in bronze windows where a special architectural effect is required.

P

PAINT This consists essentially of a pigment such as red oxide, ground in vegetable drying oils such as linseed oil. When applied to an article it gradually dries out to form a protective and/or decorative film.

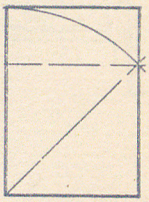
Windows can be painted by dipping, spraying or brushing. The first method is most usual. It is essential for rust prevention that the frames should be clean and free from rust, grease and loose scale before paint is applied. Two coats are usual, the first a filler coat and the second a protective coat containing varnish. It is necessary that the first coat should be thoroughly dry before the second coat is applied. Stove drying as opposed to natural air drying is done in ovens at a temperature of 250–300° F.

Accumulated coats of paint are a frequent cause of windows jamming and the careless application of paint to fittings and bolts prevents their free action.

Paint is often damaged in transit and on the site and it is desirable that all signs of rust are

removed before finishing coats are applied. An undercoat of an oil based material containing inhibitive pigments and a finishing coat of a synthetic water-resisting material are recommended.

PANE Single sheet of glass in the subdivision of a window. The classical proportion of a vertical rectangular pane calls for the height to be equal to the diagonal of the width. In recent years this shape of pane has been largely altered by omitting all vertical glazing bars resulting in a pronounced horizontal proportion. A more recent tendency seems to be to omit all glazing bars.



PROPORTION OF PANE

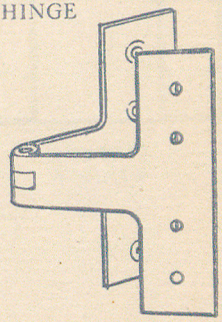
PANEING DOWN When the contact of a casement and frame is found in manufacture to be defective owing to inaccurate rolling or hanging, the weathering flange which is not making contact is hammered down until it does. This is called 'paneing down' or 'bedding in'.

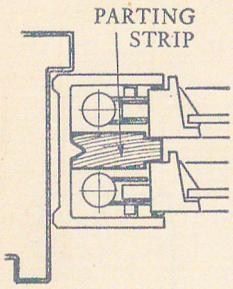
PANIC BOLTS In cinemas and such places of public gatherings bolts are applied to doors which allow them to open automatically outwards in case of sudden pressure by people rushing towards an exit.

PARKERIZING A process similar to Bonderizing but requiring longer immersion.

PARLIAMENT HINGES Hinges with tee shaped leaves used for shutters which lie flat against the wall when open.

PARLIAMENT HINGE



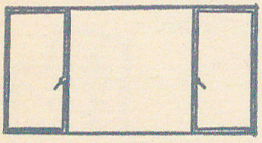


PARTING STRIP A bead used in the jambs of sliding windows to keep the two sliding leaves apart.

PEG STAY A peg stay is a bar of flat or channel-shaped metal attached to the opening frame by a universal joint or knuckle for the purpose of holding the casement open at varying positions. Holes are drilled in the stay at intervals in its length. An upstanding tapered peg is riveted to the fixed frame. The window is held in the desired position by the stay being placed over the peg in the required hole.

PHOSPHATE COATINGS The use of these coatings ensures that paint is applied to clean surfaces and that the paint has good adhesion. In this way the maximum life of the paint film is achieved.

The coating is usually applied by dipping in a hot solution of phosphates for a certain time. There are a great many proprietary materials on the market but perhaps among the best known are Bonderizing, Parkerizing, Granodizing and Coslettizing.

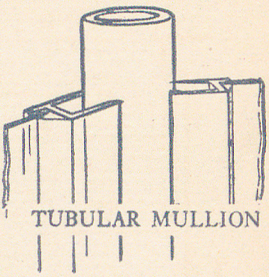


PICTURE WINDOW

PICTURE WINDOW A large single sheet of glass usually between two opening casements. Has largely replaced the bay window in artisans' dwellings.

PINTLE Hinge pin, i.e., a pin upon which some other part turns.

PIPE MULLIONS For the purpose of coupling windows together at any angle, tubes are used. These are called pipe mullions. The standard is $1\frac{3}{4}$″ diameter.


TUBULAR MULLION

PITCH The pitch of rivets or screws is the distance from centre to centre.

PIVOT The centre around which anything revolves. Also the name given to the particular type of hinge used on S.M.W.s.

PLATING Electrically depositing one coat of metal upon another for protection or ornament.

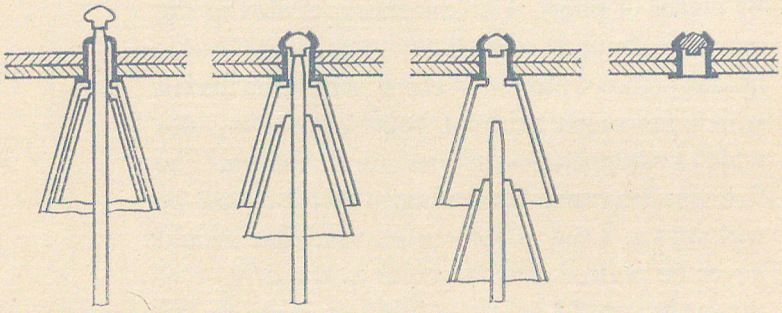
PLUGS The most usual method of fixing windows, or practically anything, to masonry is by means of plugs. A hole is cut or drilled in the masonry about $\frac{3}{4}$″ wide by 2″ to 4″ deep. In this hole is placed a piece of wood or similar material, which fits nicely without being driven in, into which ordinary wood screws can be driven. The fixing screw expands the plug so that it cannot be withdrawn. Lead is sometimes used but should never be poured into the holes as the driving of the screw would split the brick or stone unless there was sufficient room for expansion. Elm is the best wood for plugs as it does not rot when buried, as is the case with some woods.

POINTING All metal windows should be pointed after fixing to ensure weathertightness

between the metal and the surrounding frames, whether of wood, steel, brick or stone. The process consists of raking out (in the case of masonry) any cement which may have accumulated in the joint, and packing the gap with mastic cement. This must be firmly pushed into the joint with a special tool. Failure to do this is a frequent cause of leakage.

POMEROY Most metal window makers in the United States produce pressed steel double hung windows. Pomeroy is one of the best known.

POP RIVETS An alternative form of Chobert rivet.



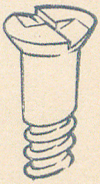
1 2 3 4

POWER RIVETING The usual method of riveting by hand hammer has been substituted by various mechanical means—electrical, hydraulic, power press, etc.

PRESSED STEEL FITTINGS During the restriction on the use of non-ferrous alloys, Standard Window hardware has been made of pressed steel.

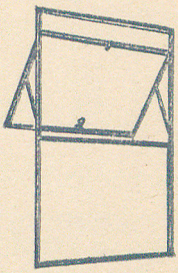
PRIMING COAT Metal windows should be dipped in paint immediately after sandblasting. This paint is only intended as protection during transit and erection. The window must be painted by hand after glazing, at least two coats.

PRISON SCREWS In cases where for some reason rivets are undesirable or impractical, screws are used in which the slot is removed for half the length on either side so that whereas there is the usual support for the screwdriver for fastening the screw, there is no support in the opposite direction.



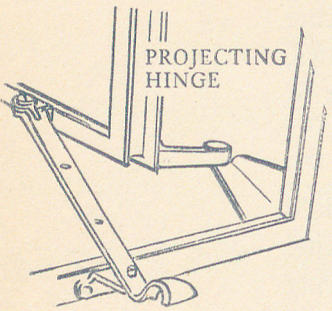
PRISON SCREW

PROJECTED WINDOWS Alternative to H.C.H. ventilators used in tropical countries to provide maximum ventilation without internal projection to facilitate the use of sunblinds. The opening portion is provided with spring loaded projections at each end of the top rail which slides up and down in the jambs and is pivoted to the frame by concealed side arms: they may also be made inward-opening.



PROJECTED WINDOW

PROJECTING HINGES Hinges in which the centres are advanced from the ordinary position to allow a space between the fixed and opening frames when open.



(*a*) To allow the arm to pass through to clean the outside of the glass.

(*b*) To allow the opening frame to lie against the outside face of the wall.

PULLEY A small wheel to guide cords connected with window openers.

PULLMAN SPRINGS (COILED) Clock springs with steel tape extensions inserted into the jambs of vertical sliding sash. Used instead of weights and cords.

PUTTY A mixture of whitening and linseed oil used for bedding glass when glazing. For metal windows it is usual to add a small amount of varnish or resins to counteract the lack of absorption and to hasten drying.

Q

QUADRANT A quarter circle of spring steel attached to the outside of the fixed frame of a casement against which the opening frame rubs, and is held in any position by friction. An old-fashioned type of fitting seldom used nowadays.

QUARRY Lead glazing.

R

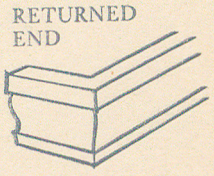
RABBET OR REBATE An upstanding surface forming a check against which a frame may be fixed or shut. Thus we have glazing rebates on *opening* frames against which glass is fixed, or rebated frames against which a casement may be fixed.

RADIUS CORNERS In hospital windows the corners of the frames are sometimes rounded thus making them easier to clean.

RAISED HEAD Countersunk screws are sometimes made with semi-domed heads as they give rather a nicer appearance when used for attaching beads or fittings.

RENDERING The plastered surface to rough brickwork is called rendering. Also called stucco, or harling (Scotland).

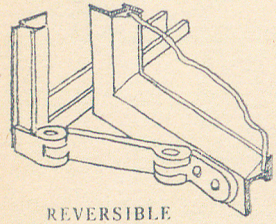
RETURNED END The continuation of a moulding, projection, etc., in an opposite direction, generally at right angles, as round an external corner. When two surfaces join each other at an angle one is said to be in return to the other.



REVEAL The return side of a rebate is a reveal. It is generally understood to mean the

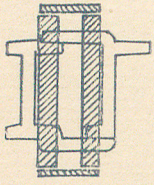
face of the jamb between the metal frame and the interior face of the wall.

REVERSE WELDS The swing bars of centre-hung casements are usually formed by butting and welding two pieces of the same section turned the other way round.



REVERSIBLE HINGES

REVERSIBLE HINGES Hinges with two knuckles, the first acting as an ordinary hinge, the second an extension of the first and attached to the middle of the opening frame to allow the frame to be reversed or turned when opened for cleaning. (Obsolete.)



RING CENTRES

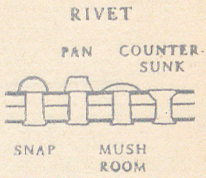
RING CENTRES An alternative to the cup pivot for hanging centre-hung casements, consisting of two brass discs or cups attached to either frame and enclosed in a brass ring.

RISE The depth of an arch in a semicircular head.

RISING HINGES The knuckle joint of a hinge may be bevelled to allow the door or window frame to rise when opening. The object is usually to clear carpets or to make the door or window self-closing.

RIVET A short length of metal rod with a head at one end used for attaching fittings or two pieces of metal together. Holes of equal diameter are drilled in each piece to be riveted and a rivet

placed in the holes longer by the diameter of the hole than the thickness of the pieces to be riveted. The heads may be snap, pan, mushroom or countersunk.



ROLLED STEEL SECTIONS Steel windows are made of section bars formed by passing heated billets through a succession of rollers of the required shape: a billet rolled out to 120 ft. long is cut into 18–20 ft. lengths for transport. A high degree of accuracy is essential for economic manufacture and weathertightness.

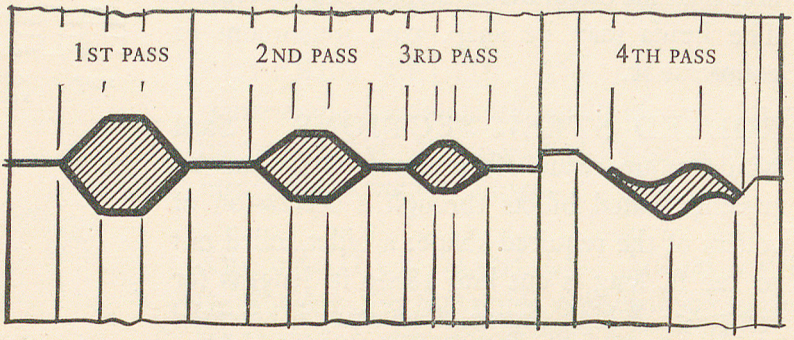
ROTOR FITTINGS Used for opening and closing hinged casements *through* a fixed flyscreen. Consisting of a pivoted arm actuated by a hand operated worm-driven rack mounted on the fixed frame and provided with a brass stud at the other end. This engages with a narrow brass guide fixed beneath the opening frame.

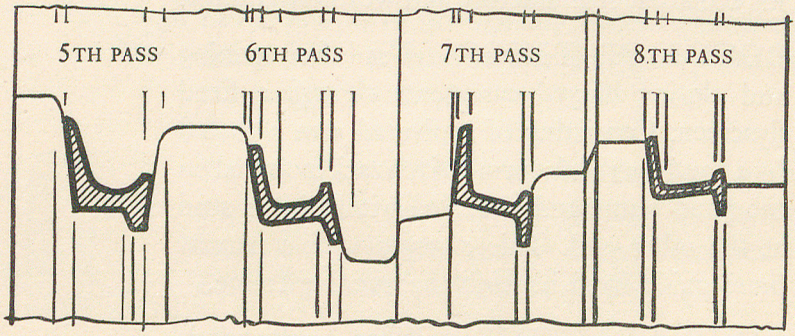
ROUGH CASTING When brickwork is plastered, pebbles or small stones are sometimes scattered over the plaster whilst it is still wet. This is called rough casting or pebble dashing.

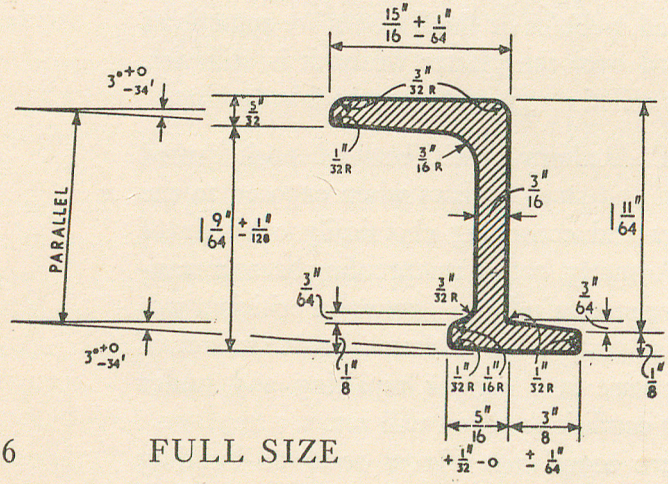
RUST Red or yellowish brown deposit formed on iron and steel surfaces when exposed to the weather and consisting chemically of oxide of iron. Formerly, before rustproofing became standard for steel windows, a common criticism was that they rusted. This was usually due to lack of proper care and regular repairing and under similar conditions, wood will rot.

Where complaints of rust occur on building

ROLLING SECTION FROM BAR







M6 FULL SIZE

sites on windows that were in perfect condition when they left the factory, the causes may be sought among the following.

(*a*) The windows were left lying around exposed to the elements for too long and the decorative primer applied over the rust.

(*b*) The decorative primer may have been unsuitable or applied during wet weather, or to wet and dirty surfaces.

(*c*) The decorative finishing coat may have been incompatible with the primer, applied long after the primer, or intended for internal application only.

RUSTPROOFING In the building trade this term usually means the protection of steel by a metallic coating such as zinc, and such a finish is adopted when protection against rust of a more permanent nature than that provided by normal painting is required.

The rustproofing processes are:

(*a*) Hot Dip Galvanizing.
(*b*) Zinc Electro-plating.
(*c*) Sherardizing.
(*d*) Metallization or Zincspra.

(*a*) *Hot Dip Galvanizing.* This process is by far the largest user of zinc for rust proofing. In this process rust and scale on the steel are removed by 'pickling' in acid. The acid is then washed off and the window frames 'fluxed' and dried preparatory to total immersion in a bath of molten zinc. They are withdrawn slowly and vertically to give an even and continuous zinc coating of .003–.004 in. thick. This zinc layer is alloyed to

the steel and thus has excellent adhesion. Windows which have been hot dip galvanized are despatched to the site unpainted.

(*b*) *Zinc Electro-plating* (cold galvanizing). Suspending frames in a chemical solution in a vat and passing an electric current between them and slabs of zinc, known as anodes. The electric current removes particles of zinc from the anodes and deposits them on the frame.

(*c*) *Sherardizing*. Placing the objects in a container filled with zinc dust and subjecting them to a temperature of up to 400° C. for two hours. Applicable only to such objects as can be put into containers, e.g. fittings, bars, etc.

(*d*) *Metallization or Zincspra*. Frames are first shot-blasted to rid them of all scale and extraneous matter and to provide a keyed surface. They are then sprayed with zinc vapour produced by passing zinc wire through an oxy coal gas flame which liquefies it and passing through an atomizer emerges in the form of vapour which solidifies on touching the cold metal frames. This method is also used on bars and frames that are too large to go into the galvanizing bath. Windows which have been zincsprayed or cold galvanized are factory primed before despatch to protect the surface during transport and erection.

S

SADDLE BARS Ordinary lead glazing is usually too flimsy to withstand wind pressure or

cleaning without some reinforcement. To overcome this, light steel rods are fixed across the opening frame behind the lead glazing, usually in line with one or more of the cames. Short lengths of copper wire are soldered to the cames and twisted round the bar. Care must be taken to tuck the ends of these wires under the bar as otherwise they may tear curtains. *See Steel Cored Leads.* The use of saddle bars has been largely superseded by steel cored leads.

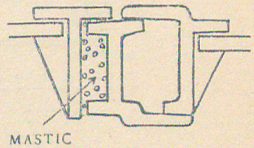
SANDBLASTING A method of removing scale, dirt and rust from steelwork before painting by blowing broken flint or chilled iron shot at high pressure on to the steel bar or frame.

SASH From French chassis—frame. Generally meaning a sliding window. In the metal window business sashes generally mean metal factory windows.

SASH WEIGHTS Lead or cast iron weights attached to each side of sash to balance it at any height.

SCALE During its manufacture rolled steel is subject to oxidization. This takes the form of a hard skin on the bar which can be removed by stretching, sandblasting, pickling in acid, or grinding.

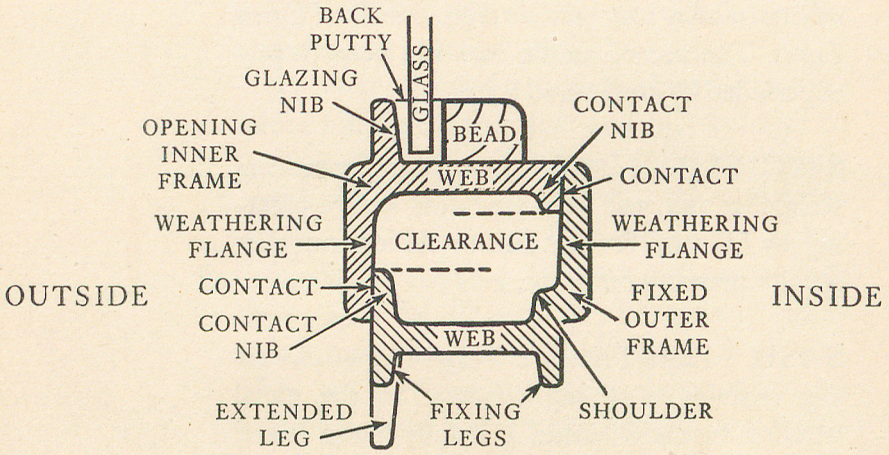
'SCREW-IN' CONSTRUCTION A fixed light divided into the necessary number of



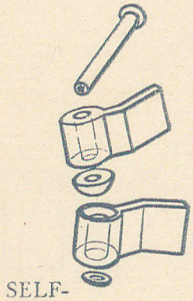
SCREW-IN CONSTRUCTION

panes into some of which is screwed a self-contained casement of the required type.

SECTIONS Metal bars from which windows are made. Also called profiles.

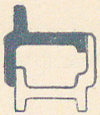


SEGMENTAL HEAD A segmental head is the curved top or arch of a window which is not a complete semicircle.

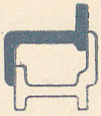

SELF-ALIGNING HINGE

SELF-ALIGNING HINGES A half spherical phosphor bronze washer resting in a similarly shaped depression in the lower leaf of the hinge through which a pin, closely fitting in the upper leaf, passes. The pin has clearance in the lower leaf allowing for axial alignment between upper and lower hinges. Intermediate

SECTIONS

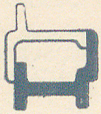


Opening or Inner Frames

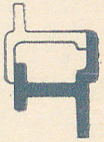


S5 Wt. 1.093 lb.
M5 Wt. 1.545 lb.

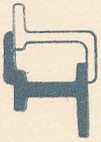
S6 Wt. 1.093 lb.
M6 Wt. 1.545 lb.



Outer Frames



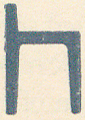
Outer Frames



S8 Wt. 1.270 lb.
M8 Wt. 1.718 lb.

SZ8 Wt. 1.457 lb.
MZ8 Wt. 1.929 lb.

SX8 Wt. 1.457 lb.
MX8 Wt. 1.929 lb.



Fixed Lights



Fixed Lights



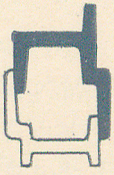
S9 Wt. 1.542 lb.
M9 Wt. 2.060 lb.

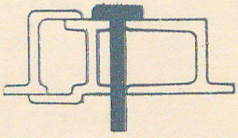
SX9 Wt. 1.701 lb.
MX9 Wt. 2.245 lb.

SZ9 Wt. 1.701 lb.
MZ9 Wt. 2.245 lb.



Door Sections

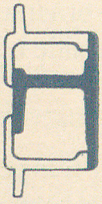




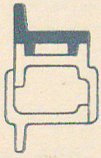
MX6 Wt. 2.114 lb.

MZ5 Wt. 2.114 lb.

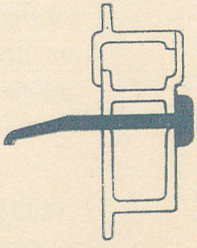
Mullion Coupling
K1 Wt. 1.355 lb.



Fixed Meeting Rail
S3 Wt. 1.807 lb.
M3 Wt. 2.432 lb.



Narrow Sight Coupling (Lloyds)
S2 Wt. 0.825 lb.
M2 Wt. 0.993 lb.



Transome Coupling
K7 Wt. 1.912 lb.

hinges are replaced in taller windows and doors by keeps.

SEMI-HEADS Semicircular headed windows.

SETTING OUT Formerly steel casements were made throughout from the bar to the finished window by a skilled man, the overall sizes and position of glazing bars and fittings, etc., being marked off on a wooden spline. This marking of splines was what is now called setting out. The practice has been considerably developed in recent years. A complete specification of each window is written out in the office and translated to the actual bars by skilled setters out in the shop.

SHERARDIZING *See Rustproofing.*

SHUTTER Solid or slotted wood or metal panel applied to window openings to keep out sunlight or burglars. They may be hinged, sliding or detachable and occasionally for ornamental purposes permanently fixed on either side of the opening.

SIDE ARMS To prevent bottom-hung casements falling right down, projecting bars with ends turned inwards are attached to the sides of the fixed frame. Alternatively, these projecting bars can be made to drop down when the window

is shut, or they may be concealed between the opening and fixed frame.

SIGHT LINE The line at which the glass reaches the metal frame before it is obscured by the rebate. In all Universal Casements the sight lines are equal in fixed and opening parts. With Standard Metal Windows the opening frame is wider than the fixed frame and does not line with it.

SILL The bottom member of a door or window opening. Sometimes spelled Cill.

SILL ADJUSTER *See Clamp.* Now obsolete.

SIZES The only irretrievable fault in any window is that it is the wrong size. The taking of window measurements is a skilled and responsible job. *See Allowances.* In large modern buildings it is usual to agree the sizes with the builder before the opening is made. This avoids delay.

SKYLIGHTS Frames to provide light and ventilation in the roof, variable in type and construction.

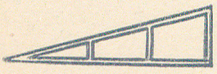
SLIDING FOLDING WINDOWS *See Concertina Windows.* Multi-leaved folding windows hinged together and suspended from a roller at the head and sliding concertina-wise in a

horizontal direction, the object being to provide 100% opening without obstruction over any width.

SLIDING STAY A fitting for holding the window open in any position, the most usual type consisting of a brass slide mounted on brackets fixed to the opening frame upon which slides a box controlled by a thumb screw. To the bottom of the box is attached a pivoted arm hinged at its other end to the fixed frame.

SLOTTED HOLES Oblong holes punched in the frame to receive the ends of glazing bars.

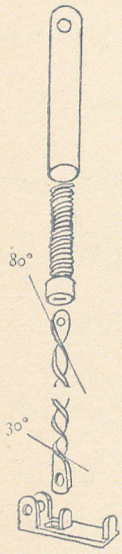
SLUM TYPES *See Sublights.*



SPANDRIL

SOFFIT The underside of a lintel or beam.

SPANDRIL In glazed and sloping roofs a wedge-shaped space in the gable is formed. This is called a spandril.



SPIRAL BALANCE

SPIRAL BALANCE A flat steel rod twisted in an increasing spiral operating through a spring enclosed in a metal tube, for counter-balancing double-hung sashes in place of weights and cords.

SPLAYED Set at an angle to the face of the building.

SPLINES *See Setting Out.*

SPRIGGS Metal pins put through holes in glazing bars to reinforce putty and prevent glass being blown in or out.

SPRING CATCH A fitting used on H.C.H. and bottom-hung windows to keep them shut, consisting of a spring plunger on the opening frame engaging with a hole in a plate on the fixed frame.

SPRINGING In windows with bent heads the point at which the curve begins.

STAINLESS STEEL Steel alloy containing approximately 12% chromium to which 8–10% nickel is added rendering it rustless when polished.

STALLBOARD LIGHT The stallboard of a window is the flat shelf forming the floor of the shop window upon which the goods are displayed. When cellars are situated beneath the shop they are lit by a window placed between the bottom of the shop window and the pavement level, which is called a Stallboard Light.

STANDARDIZATION Certain types of metal windows, such as domestic casements and factory windows, have been standardized both in size and construction with a view to reducing their cost. By standardization certain economies in manufacture can be effected, such as:

(1) reduction of specially trained staff for setting out;

(2) elimination of waste;

(3) subdivision of manufacture into separate processes so that every operation may be performed by semi-skilled or unskilled labour;

(4) manufacture for stock.

The standardization of the metal window does not, in its proper sphere, impose any greater limitation on the designer than the already standardized size of the bricks which surround it.

STANDARD METAL WINDOW (Abbreviation S.M.W.). A range of casement type windows originally designed for use in housing schemes, but now used in various kinds of buildings. English makers have all adopted the same set of sizes and the designs are generally similar, varying only in such details as fittings.

STANDARD SASHES A range of standardized factory windows based on a glass pane size of 12″ × 18″.

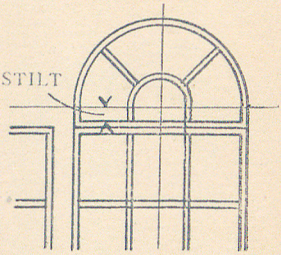
STAY Any fitting for holding a casement open. *See Peg Stay*, *Sliding Stay*, *Telescopic Stay*.

STAYBRITE *See Chromium Steel.*

STEEL-CORED LEADS A substitute for saddle bars to stiffen lead glazing. A small steel rod is run through the middle of the lead came.

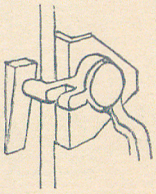
STILE Vertical frame member.

STILT In semicircular frames the radial point is sometimes moved upwards for convenience of spacing the glazing bars thus leaving a small length in the frame which is vertical. This space is called a Stilt.



STORM SASH Glazed (usually) aluminium frame attached to the inside of windows during cold weather to reduce heat losses through glass. Taken off and stored during warmer weather.

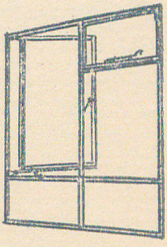
STRIKING PLATE A piece of brass riveted to the side of the metal frame for the handle to engage with when shutting. Striking plates are wedge-shaped to assist the handle in closing the window by drawing it tightly to the fixed frame.



STRIKING PLATE

SUBFRAMES Metal frames built into masonry into which casements are fixed after rougher trades (bricklayers, plasterers, etc.) have left the building. The object is to protect the window from damage.

SUBLIGHTS Panes, fixed or opening, under the principal opening parts of windows. Used particularly in tenements and high buildings as a safety measure, and also to provide a protected shelf for flowers, books, etc.



SUBLIGHT

SUNBREAKERS Vertically pivoted slats, usually of aluminium, across a window opening to provide sun-protection.

SWINGING DOORS Doors in corridors and entrances where there is a large amount of traffic are occasionally hung on spring hinges or pivots which enable them to be opened by pushing in either direction. The spring has the action of automatically closing the door.

SWINGS Horizontal centre-hung casements.

T

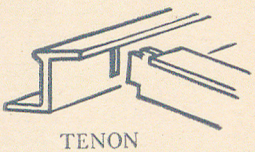
TEE BARS Glazing bars rolled or extruded in the form of a T.

TELEFLEX GEAR An alternative to Arens or other type of wire-operated gear for opening transome lights.

TELESCOPIC STAY A stay consisting of a brass tube pivoted to the fixed frame of a casement inside which a plunger is fitted attached to the opening frame. The plunger is fitted with friction springs inside the tube which make it travel more or less stiffly, thus the opening frame is held in any position by friction. Usually fixed at the top of the casement.

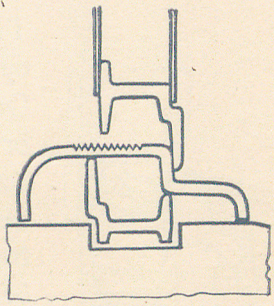
TEMPLATE A piece of wood or metal cut to the exact shape of any circular or otherwise non-symmetrical opening for the purpose of making a metal frame to that size or shape.

TENON Latin, Tenere—to hold. The ends of glazing bars are cut off with shouldered projections to go into the slots provided for them in the frames. These projections are riveted over to prevent them coming out. Hinges on S.M.W.s are attached in the same manner.

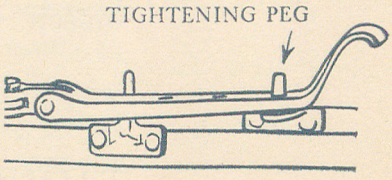

TENON

THERMOPANE *See Double Windows.*

THRESHOLD The bottom member of the fixed frame of a door. This may be of the same section as the rest of the door but to avoid the danger of tripping flat bars are occasionally substituted or, alternatively, special sections of rust-proof steel or brass designed to provide a slight weather check and at the same time to offer a minimum projection.


THRESHOLD

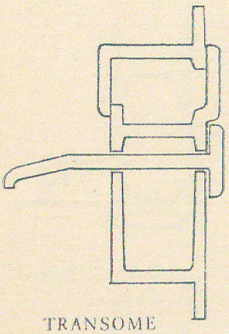
TIGHTENING PEG Top-hung casements opened by a peg stay are provided with an upstanding peg riveted to the fixed frame at the bottom, behind which the stay is folded with a lever action when shutting.



TORSION The rigidity of a metal window opening frame is determined mainly by the thickness of the web and is measured by its resistance to twisting. This is expressed in CI_0 values. 'C' representing the polar moment of inertia

determined by the size and shape of the section. 'I_0' representing torsional modulus of elasticity or rigidity determined by the material from which the section is made, e.g., steel, aluminium, etc. *See Appendix II.*

TRACERY Stone ornamental openwork, especially in the head of a Gothic window.



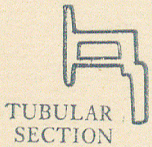
TRANSOME

TRANSOME The horizontal division of an opening, as the mullion is the vertical division. Originally in wood or stone and sometimes in brick. In composite windows the horizontal coupling bar is called a Transome. This bar, besides being a coupling bar, combines the function of a drip or weather bar to the casements below it and a stiffening bar to the whole window. Where metal mullions and transomes occur in the same opening they can be interlaced thus greatly increasing the strength of the combined window.

TREFOIL Three lobed ornament in tracery.

TRIANGLE PLATE *See Back Plate.*

TRIM Covermoulds.



TUBULAR SECTION

TUBULAR SECTIONS These are formed by welding a continuous flat across the channel of rolled window sections. Abnormally large windows can be made rigid by the inclusion of one

tubular member in the four sided frame. *See Torsion.*

TURNBUCKLE Simple type of casement handle usually consisting of a pivoted arm mounted on the opening frame and engaging at quarter turn with the fixed frame. Common on antique casements and now used in a modified form as a supplementary handle.

TWIGGING, TWISTING OR WHIPPING *See Torsion.*

TWO-POINT HANDLES The noses of handles are sometimes provided with a slotted projection so that it may engage with the striking plate in a 'not quite' shut position without rattling. This is to provide a small amount of ventilation at night.


TWO-POINT HANDLE

TWO-THROW HANDLES Casements over 5′ 6″ high require more than one handle to keep them firmly shut. In such cases two handles are used, joined together by a connecting rod so that by operating the lower handle the upper one is also worked.

TYPHOON BARS In places such as Hong Kong and the West Indies, which are subject to wind storms of excessive violence, windows and doors are sometimes reinforced by fixing a stout bar or tube across the opening from jamb to jamb to which the opening frames are fastened.

U

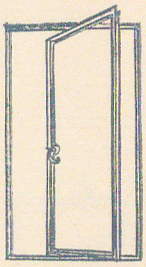
UNIVERSAL CASEMENTS The universal casement sections enable a casement of any type, whether opening outward or inward, swinging or fixed, to have the same sight line and appearance, and are adaptable to every construction of opening, the glass always being the same plane. The patent lies in the parent section from which the swinging bars of centre-hung casements are formed by cutting away superfluous members instead of screwing them on, which was the previous practice. This method has been abandoned in favour of welding together two bars of the same section reversed. Every section (except fixed light) can be formed from the parent section although in actual practice separate rolls exist for each section.

V

VENETIANS Window blinds made of wood or aluminium slats joined with webbing which can be raised or lowered and, in the latter position, turned so as to admit or exclude light.

VENTS (Abbreviation of ventilator). Windows or parts of windows which open, usually indicated on drawings by a diagonal cross.

VERTICAL CENTRE HUNG (Abbreviation V.C.H.). Casements with pivots or centres in the top and bottom bars so that part of the casement opens outward and part inward. The usual position of the pivot is one-third of the width so that two-thirds of the casement opens outward. The purpose of vertical centre-hung casements is to facilitate cleaning the outside of the glass. On very wide casements of this type handles are sometimes provided on both inward and outward portions to ensure tight closing.



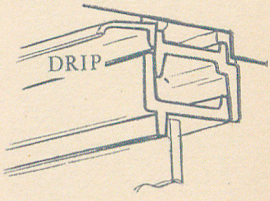
V.C.H.

VERTICAL SLIDING SASHES Windows in which leaves move upwards and downwards in grooved jambs. *See Double Hung Windows.*

W

WASHER A metal, rubber or plastic disc with a hole in the centre used for various purposes.

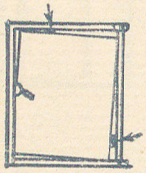
WEATHER BAR A strip of metal, preferably in rustproof steel or brass, projecting from the outside face of the casement for the purpose of throwing off rainwater which runs down the face of the wall or glass.



WEATHERING When an opening metal frame shuts against a fixed metal frame the

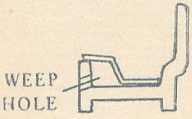
touching surfaces are called weatherings or contacts.

WEB The transverse member of a section.



WEDGES

WEDGES Wood wedges are used in glazing a window, particularly in large panes, between the glass and the metal frame, to throw the weight of the glass on the hinge side of the frame. Small wooden wedges are often used on sliding wooden sashes to prevent them rattling. Wedges are also used in temporarily fixing and adjusting metal windows into their openings, preparatory to cementing the lugs into their holes.



WEEP HOLES Holes drilled in the fixed sill bar of casements to allow accumulated water to escape. Covers are sometimes fixed over the weep holes, particularly on inward opening casements, to prevent wind blowing directly through the weep hole and causing leakage, but in practice these usually get clogged with paint or insects and soon become inoperative.

WELDING Uniting pieces of metal to form an autogenous joint by pressure or hammering after the metal has been heated to a plastic or semi-fluid state.

BLACKSMITH'S WELDING

Originally the ends of two pieces of iron to be joined together were heated in the blacksmith's fire till plastic, placed one over the other in a

lapped joint and hammered together until they were completely united. Later other means of heating and joining together metals were devised, such as oxy-acetylene flames and electric arc welding. For these methods, which give very high temperatures, a filler rod or electrode is used which melts and fuses with the pieces to be joined together, filling up the joint which is often bevelled in a 'V' to receive the rod. The metal at the joint in this case tends to have the nature of a casting. To prevent porosity and the absorption of oxygen the electrodes are often coated with a flux which fuses simultaneously and covers up the fluid metal as the welding proceeds until the joint has cooled, when the flux is chipped off. An alternative to this is the introduction in the case of arc welding of a blanket of argon gas over the joint which has the same blanketing effect, excluding the oxygen. Another development was the introduction of hydrogen blown into the joint through an electric arc which both adds to the heat by an atomic disruption of the hydrogen and also has the blanketing effect by excluding the oxygen. This is known as atomic hydrogen welding. The electric welding most commonly used in modern production methods can be broadly divided into two groups; arc welding and resistance welding.

ARC WELDING (*with bare electrodes; with covered electrodes; Carbon Arc Welding; Argon Arc Welding; Atomic Hydrogen Welding*)

In arc welding the work is clamped in position and connected to one terminal of the arc welding

machine and the electrode rod which may be bare or coated is connected to the other; the rod is consumed in filling up the joint. The arc can also be formed between carbon electrodes, the rod being fed in separately, or between tungsten electrodes, when the rod is fed in with the addition of argon gas.

ARGONAUT WELDING PROCESS

In this case the filler rod comes off a continuous reel and the arc is formed between the end of the filler rod and the work, in an atmosphere of inert argon gas.

HIGH FREQUENCY ARC WELDING

A further refinement to arc welding is the introduction of a super-imposed high frequency current which ionizes the atmosphere and adds greatly to the stability of the arc and welding conditions.

RESISTANCE WELDING

This is sub-divided into: Spot Welding, including Stitch Welding: Projection Welding: Seam Welding: Butt Welding: Flash Welding. The basic principle of these types of welding is that two pieces of metal, each of which is connected to the opposite polarity of a source of electrical energy, are brought together under pressure, when the resistance to the flow of current provided by the contact points produces an intense local heating which makes the metal plastic so that the continued application of pressure causes them to unite.

SPOT WELDING

For joining sheets which are squeezed at a spot

between two copper electrodes with a small contact area. A series of automatically applied spot welds is called Stitch Welding.

PROJECTION WELDING

Projections or lumps are made on the surface of the pieces to be united which are clamped between large copper electrodes and the current is localized to the areas of contact of the projections.

SEAM WELDING

Where two edges of sheet metal are joined together by rolling electrodes consisting of two wheels carrying current being rolled along the joint.

BUTT WELDING

Where two pieces of metal are brought up together butted end on and movement is gradually applied as the metal softens finishing with a squeezing together of the two ends finally to complete the joint.

FLASH WELDING

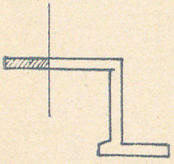
This is more truly a mixture of resistance welding and arc welding. The pieces to be joined together are quite rough in finish and they are slowly brought together with the voltage applied the instant they touch at one point, the very large current that flows blows away the contact point creating an arc or flash. The pieces continue to move together flashing until the ends of both pieces of metal have become white hot and a certain amount of metal has been blown off both of them. They are then bumped together suddenly by what is known as the upset movement. The joint is, therefore, something of the character

of the old blacksmith's welding, i.e., nearer a forged joint than a cast joint.

COLD WELDING

Aluminium, which can now be welded by many of the above methods with certain refinements, is now also being cold welded under the mere effect of extreme contact pressure.

WHITE ANT A tropical insect which lives on soft wood in countries such as South Africa and India. He does not like teak but will destroy practically any other kind of wood.



WIDE FRAME

WIDE FRAME When the outer frame of the Standard Metal Window is said to be too narrow in appearance, or for other purposes, a frame $\frac{1}{2}''$ wider is used.

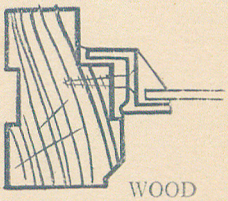
WINDOW Any dictionary will define this word as an opening in a wall for the admission of light and air. The first elaboration of such openings was to provide them with shutters to keep out the wind and rain.

WINDOW BREASTS OR PANELS It is becoming more and more usual, particularly in large commercial buildings, to design window openings covering several floors. In such cases a metal panel, really part of the window, is introduced at each floor level extending from about 1′ 0″ below ceiling line to about 2′ 6″ above floor line of the next storey. This panel, which may be

of either wrought or cast material, can be architecturally treated with metal mouldings or cast enrichments in iron, bronze or lead.

WINDOW TAX A tax first levied in England in 1697 for the purpose of defraying the expenses of making up the deficiency arising from clipped and defaced coin in the recoinage of silver during the reign of William III. It was an assessed tax on the rental value of the house, levied according to the number of windows and openings on houses having more than six windows and worth more than £5 per annum. The revenue derived from the tax in the first year of its levy amounted to £1,200,000. The tax was increased no fewer than six times between 1747 and 1808 but reduced in 1823. There was strong agitation in favour of abolition of the tax during the winter 1850–1 and it was accordingly repealed on 24 July 1851 and a tax on inhabited houses substituted. To avoid the tax many window openings were bricked up and then painted to represent the window.

WOOD SURROUNDS Standard Metal Windows are sometimes criticized as looking too 'thin' when fixed direct to brickwork. To overcome this they are sometimes fixed into wooden frames. Whilst on purely technical grounds the interposition of wood between a metal frame and a brick opening may not be justified, on the other hand the presence of the wood frame facilitates fixing and often protects the metal windows


WOOD SURROUND

from misuse and maladjustment during transport and erection.

Z

ZINCSPRA Metallization. *See special paragraph on Rustproofing processes.*

ZINTEX Electro-zinc plated sheet steel.

Z RANGE A range of standardized windows to meet modern architectural fashion. Similar to the 1′ 8″ range only 2′ $0\frac{3}{4}$″ wide.

guages does not
s peculiar to the
n has been com-
tal window trade
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ERRATA

ENGLISH	FRENCH	SPANISH	GERMAN	DUTCH
Pages 74–5				
Beads		Cerco para masilla	Kittrahmen	
Bolt			Treibriegel	
Bottom Hung	Chassis à Soufflet	Hoja Basculante		
Brass		Latón		
Brick				Baksteen
Concrete			Beton	
Condensation gutter		Canal de agua condensada		Condenswatergootje
Flyscreen		Mosquitero		Muskietengaasraam
Folding	Chassis à Deux Vantaux	Ala de pestaña		Stolpraam
Folding with meeting rail	Chassis à Deux Vantaux avec Montant Central	Pestaña de tope central fija		
Gearing		Engranaje		
Glass		Cristal		
Glazing		Acristalar		
Glazing Bar	Petit Bois		Sprosse	Glasroede
Pages 76–7				
Horizontal centre hung	Chassis à Bascule Horizontale	Ventana corrediza horizontal		
Horizontal sliding				Opzij schuivend raam
Inside				Binnen
Iron				Ijzer
Jamb	Tableau	Mocheta	Leibung	Zijstijl
Lead Glazing	Vitrage sous Plomb	Acristalar con plomo		
Lug		Anclaje		
Opening	Ouverture			
Pane				Ruit
Peg stay	Entrebailleur	Clavija de fijación		
Pages 78–9				
Rebate			Anschlag	
Reveal		Mocheta interior	Innere Fensterleibung	
Rust		Rejilla		
Sections		Perfil		
Shutters				Blinden
Side Hung, open in		Ala giratoria lateral Abriendo hacia adentro		
Side hung, open out		Ala giratoria lateral Abriendo hacia afuera		
Sliding folding		Ventana corrediza plegable		
Sliding stay	Entrebailleur à Coulisse	Fijador corredizo		
Top hung	Chassis à Soufflet en Haut	Ala montante		
Transome		Travesaño (dindel)		
Vertical centre hung	Chassis à Bascule verticale	Ala giratoria		
Vertical sliding		Ventana corrediza vertical		Verticaal schuivend raam

APPENDIX I

FOREIGN LANGUAGE EQUIVALENTS

SINCE a working knowledge of foreign languages does not normally include technical terms and phrases peculiar to the metal window industry, the following selection has been compiled as an aid to the interpretation of the metal window trade literature, drawings, etc., of foreign countries.

ENGLISH	FRENCH	SPANISH
Beads	Parecloses	Cinta de adorno
Bolt (for closing doors)	Verrou	Cerrojo (pasador)
Bottom Hung	Basculant	Colocacion inferior
Brass	Laiton	Bronce
Brick	Brique	Ladrillo
Bronze	Bronze	Bronce
Concrete	Beton	Hormigon (limento)
Condensation Gutter	Gouttière de condensation	Gotena de condensacion
Door	Porte	Puerta
Fireproof	Ininflammable	Incombustible
Fixed	Fixe	Fijo
Flyscreens	Moustiquaire	Mosqueador
Folding	Pliant	Dobladizo
Folding with meeting rail	Pliant avec montant central	Dobladizo conbarra de encuentro
Gearing	Appareil de manœuvre or système de manœuvre	Encaje
Glass	Verre	Vidrio
Glazing	Vitrage (for roofs) Vitrerie (for windows)	Vidriar
Glazing bar	Barre à Vitrage	Barra
Handle	Poignée	Manija
Head	Haut	Parte superior

GERMAN	DUTCH	RUSSIAN
Kittraheen	Glaslijsten (when of metal) Glaslatten (when of wood)	Рейки для застекления
Triebriegel	Grendel	Засов
Kippflügel	Klepraam	Вращается на нижнем горизонтальном шарнире
Messing	Messing	Латунь
Ziegel	Metselsteen	Кирпич
Bronze	Brons	Бронза
Mortel	Beton	Бетон
Schwitzwasserrinne	Condensewatergootje	Желобок для отвода пота
Tür	Deur	Дверь
Feuerbeständig	Vuurbestendig	Огнеупорные
Feststehend	Vast raam	Неподвижные
Fliegendraht	Vliegengaasraam	Сетки от мух
Stülpflügel	Stolpram	Створчатые
Stülpflügel mit feststehendem Mittelpfosten	Stolpraam met middenstijl	Створчатые с притворным брусом
Getriebe	Bovenraamsluitingen (*a*) Hefboomsluitingen (operated with lever) (*b*) Wormkastsluitingen (operated by wormgear and gearbox) (*c*) Windwerksluitingen (operated by gearbox and lever)	(*a*) Зубчатая передача (*b*) Винтовая передача
Glas	Glas	Стекло
Verglasung	Beglazing	Застекление
Glasleiste	Glasrocde	Промежуточный брусок переплета
Handgriff	Greep	Ручка
Oberteil	Latei	Верхняя притолока

ENGLISH	FRENCH	SPANISH
Height	Hauteur	Altura
Hinge	Paumelle or Charnière	Bisagra
Horizontal centre hung	Basculant par le milieu	Colocacion horizontal
Horizontal sliding	Coulissant horizontalement (or Guillotine)	Corredizo horizontal
Inside	Intérieur	Interior
Iron	Fer	Hierro
Jamb	Montant	Quicial
Kicking Plate	Soubassement Tôle	Chapa resistente
Lead Glazing	Vitrail (plural: vitraux)	Vidrian con plomo
Lock	Serrure	Cerradura
Lug	Ergot	Arrastrar (verb)
Mullion	Meneau	Columna
Opening (in the wall)	Trou	Abertura
Outside	Extérieur	Exterior
Paint	Peinture	Pintura
Pane	Panne or Feuille	Cristal
Peg Stay	Arrêt fixe	Clavija de apoyo
Plaster	Plâtre	Revoque
Putty	Mastic	Masilla

GERMAN	DUTCH	RUSSIAN
Hohe	Hoogte	Высота
Scharnierband	Scharnier	Шарнир
Schwingflügel	Tuimelraam	Вращается на горизонтальной промежуточной оси
Horizontales Schiebefenster	Opziji schuivend raam	Задвигается горизонтально
Innen	(*a*) Binnenbeglazing (when speaking of inside glazing) (*b*) Inwendige scharnieren (when speaking of inside hinges) (*c*) Ramen van binnenuit (when speaking of windows seen from the inside)	Внутренняя сторона
Eisen	Ijzer	Железо
Anschlag	Neg	Косяк
Stossblech	Schopplaat	Нижняя плита
Bleiverglasung	Glas in lood	Застекление в свинцовых горбыльках
Schloss	Slot	Замок
Anker	Anker	Лапа
Pfosten	Stijl	Вертикальный средник
Öffnung	Opening (in den mur)	Проем
Aussen	Buiten	Наружная сторона
Anstrich	Verf	Краска
Scheibe, Füllung	Paneel	Стекло
Stiftfeststeller	Penuitzetter	Дырчатая упорка
Putz	Pleister	Штукатурка
Kitt	Stopverf	Замазка

ENGLISH	FRENCH	SPANISH
Rebate	Feuillure	Rebaja
Reveal	Jouée	Revelar
Rivet	Rivet	Remache
Rubber	Caoutchouc	Goma
Rust	Rouille	Herrumbre
Screw	Vis	Tornillo
Sections (Rolled bar material)	Profils	Secciones
Shutters	Volets	Persianas (postigos)
Side hung open in	Ouvrant à l'intérieur	Colocacion lateral Abriendo hacia adentro
Side hung open out	Ouvrant à l'extérieur	Colocacion lateral Abriendo hacia afuera
Sill	Seuil or appui	Antepecho
Sizes (dimensions)	Dimensions	Dimensiones
Sliding folding	Coulissant et pliant	Dobladizo corredizo
Sliding Stay	Arrêt coulissant	Clavija escurridiza
Steel	Acier	Acero
Stone	Pierre	Piedra
Top hung	Ferré par la haut	Colocacion superior
Transome	Traverse	Travesane (lintel)
Vertical centre hung	Pivotant verticalement par le milieu	Colocacion centro vertical
Vertical sliding	Coulissant verticalement (or Fenêtre coulissante)	Corredizo vertical
Width	Largeur	Ancho
Window	Fenêtre	Ventana
Wood	Bois	Madera

GERMAN	DUTCH	RUSSIAN
Falz	Aanslag	Фальц
Innere Fensterlaibung	Neg	Притолока
Niete	Nagel	Заклепка
Gummi	Rubber	Резина
Rost	Roest	Ржавчина
Schraube	Schroef	Винт
Profil	Profielen	Профили
Fensterladen	Blind	Жалюзи
Drehflügel seitlich, nach innen öffnend	Naar binnen draaiend raam	Открывающийся внутрь створный переплет с боковым шарниром
Drehflügel seitlich, nach aussen öffnend	Naar buiten draaiend raam	Открывающийся наружу створный переплет с боковым шарниром
Fensterbank	Dorpel	(*a*) Подоконник (*b*) Порог
Masse	Afmetingen	Размеры
Faltschiebefenster	Harmonicaraam	Задвигается и складывается
Gleitfeststeller	Schuifuitzetter	Скользящая упорка
Stahl	Staal	Сталь
Stein	Natuursteen	Камень
Klapflügel	Opzetraam	Вращается на верхнем горизонтальном шарнире
Kampfer	Kalf	Горизонтальный импост
Wendeflügel	Taats—of tolraam	Вращается на вертикальной промежуточной оси
Vertikales Schiebefenster	Op—en neerschuivend raam	Задвигается вертикально
Breite	Breedte	Ширина
Fenster	Raam	Окно
Holz	Hout	Дерево

APPENDIX II

TORSIONAL RESISTANCE OF STEEL AND ALUMINIUM SECTIONS

ONE of the fundamentals in designing windows is to use a section of sufficient strength to ensure rigidity in any given frame. Failure to use a sufficiently strong section would produce a wobbly or whippy frame and an over-strong section would mean a waste of steel. The essential physical property involved is the twist or torsion resistance of the section. Torsion resistance = polar moment of inertia × torsional modulus of elasticity, and is commonly expressed as CI_0.

The polar moment of inertia depends upon the design of the section.

The torsional modulus is a constant for any given metal, e.g.

for steel it is	$4{\cdot}2 \times 10^6$
for aluminium it is	$1{\cdot}2 \times 10^6$
for brass it is	$1{\cdot}8 \times 10^6$

From this it follows that in similar sections the CI_0 value for steel will be three times that for aluminium. This difference can be minimized by re-designing the sections but in any case the true test of rigidity lies in the glazed window. Since the glass itself is the most rigid member any difference between steel and aluminium becomes comparatively minor.

TORSION TESTING

Having established that a bar of a certain strength is necessary for a given application, it is often convenient to evaluate a section of given design by testing an actual bar. This is done by taking a 3-foot length of bar and placing it in a specially designed machine and twisting it. The CI_0 value equals $\frac{Tm \times L}{a}$ where Tm is the twisting moment in inch pounds, L

is the length of section between pointers, and a is the deflection difference of the two pointers in radians.

REAL LIFE

It may be argued that the above is an interesting theory and useful whilst the window is in the factory or in transit, but that when it has been fixed in the house and glazed, and the putty has hardened, it no longer has much significance. It is true that the pane of glass is stiffer than the frame and for 24-ounce glass over half the frame stiffness is due to the glass. There is still, however, a certain minimum requirement for the stiffness of the section.

Consider the extreme case of a glazed side-hung window, stuck at one corner, which a person is trying to open by pressure at the other. If this frame were not glazed a force of 20 lb. would push out the free corner $3\frac{1}{2}$ inches. But as it *is* glazed the distance the corner can be pushed out is much less, and is such that glass of reasonable quality can withstand without breaking.

If, on the other hand, the window frame were made of a section so weak that the same amount of force could push the free corner out 6 or 7 inches, then the glass would almost certainly break, either immediately from distortion, or from vibration caused by the sudden release of the stuck corner.

It must be emphasized that the present-day strength of sections is based *empirically* on many years' experience in the field and that the theory has come in later to explain experience.

APPENDIX III

NOTES ON ANODIZING

THE resistance of aluminium and aluminium alloys to corrosion is due to the existence of a very thin film of aluminium oxide on the surface. Anodizing or the anodic oxidation of aluminium is the process of making or inducing this oxide film artificially.

The window or object to be anodized is made the anode in the acid vat (hence the derivation of anodizing). In this sense anodizing is the reverse of electroplating (where the work is made the cathode). When the electric current passes oxygen is liberated at the anode and this combines with the aluminium to form the coating.

There are two kinds of anodizing:

(*a*) *Sulphuric acid anodizing.* This is principally used for aluminium windows. It confers a clear transparent hard coating and if this is washed down with soap and water each time the glass is cleaned it will remain bright for a considerable time.

(*b*) *Bengough Stuart* (*chromic acid process*). This confers an opaque finish varying in colour from light grey to dark grey with the various alloys.

Coloured Anodizing.

Anodized films may be dyed a whole range of pleasing colours. These, however, are generally considered unsatisfactory for long exposure to sunlight because they fade.

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